# CHECKMATE™ DL

## REFERENCE MANUAL

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# Chapter 1
# Introduction

The Checkmate™ DL handheld instrument is the convenient and hassle-free way to program and collect data from Microcor Data Loggers or Corrosometer and Corrater Remote Data Collectors (RDCs). Checkmate DL can be programmed to operate with either technology with only a few keypad entries. This portable unit can store readings of up to 50 different Microcor Data Loggers or Corrosometer and Corrater RDCs. The intrinsically safe communication between the instrument and Data Loggers or RDCs enables the user to collect data without moving the Data Logger or RDC to a safe area. Furthermore, the Checkmate DL makes transferring stored data to a PC a much simpler process than before, using the Corrdata Plus® Corrosion Management Software or the Microcor Tools Software. Refer to Appendix A for Typical System Configuration.

**Figure 1.1 Checkmate DL Instrument**

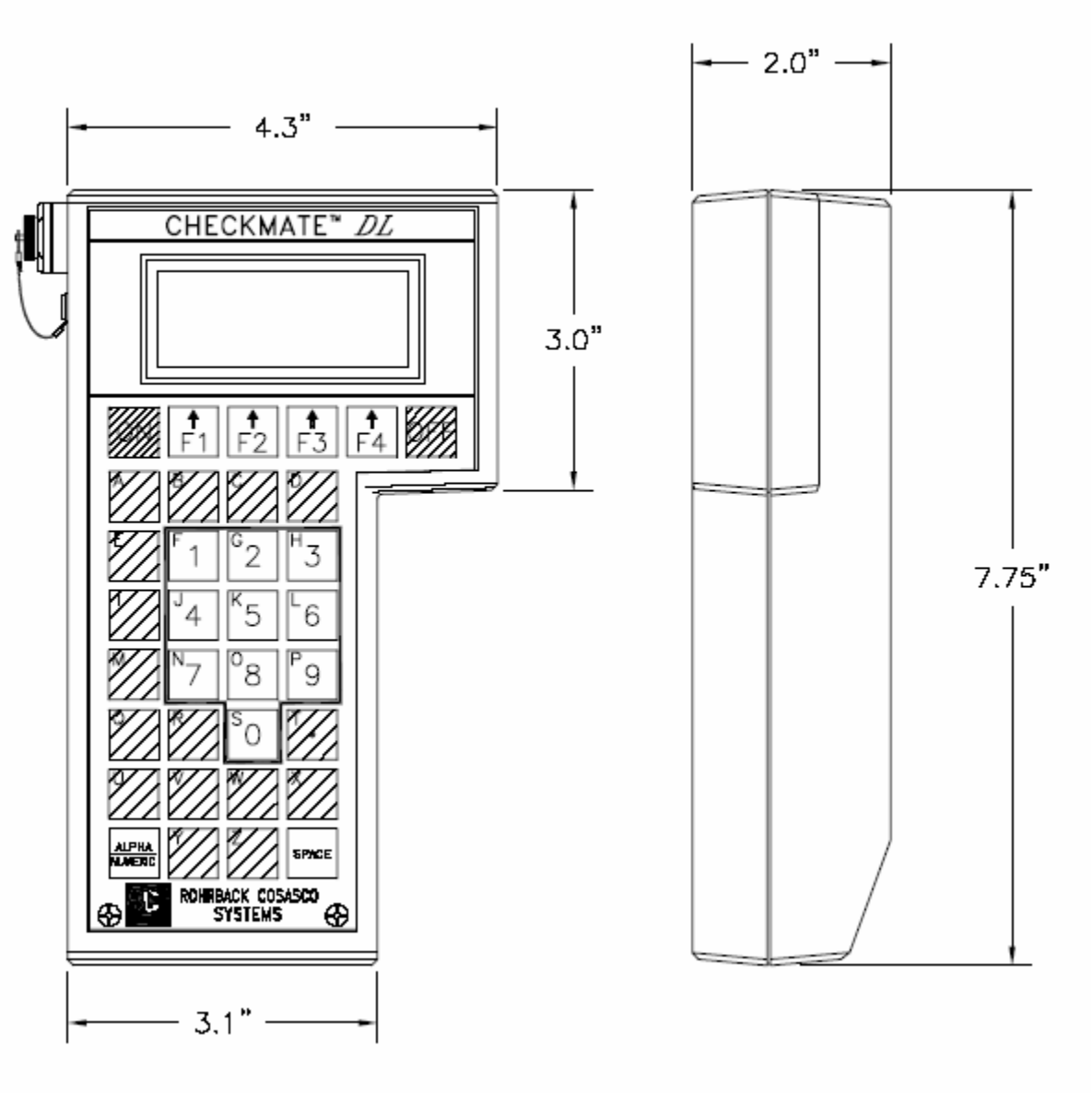



**Figure 1.2 Checkmate DL Instrument Specifications**

# Chapter 2
# Specifications

## Checkmate DL Instrument

- ✓ Dimensions: 7.75"H x 4.30"W x 2"D ( 196.8 mm x 109.2 mm x 50.8 mm )
- ✓ Weight: 1.5 lb. ( 0.68 kg )
- ✓ Temperature range:

  Operating - 0°F to 122°F ( -18°C to 50°C )

  Storage - 0°F to 150°F ( -18°C to 70°C )
- ✓ Splash-proof enclosure with sealed membrane keyboard

## Electrical

- ✓ Compatible with all Corrosometer® RDC units
- ✓ Compatible with all Corrater® RDC units
- ✓ Compatible with all Microcor® Data Loggers
- ✓ Memory for up to 50 RDCs when programmed for Corrdata Systems
- ✓ 57,330 Microcor Data Logger Readings when programmed for Microcor Systems
- ✓ Automatic power shutoff 2 minutes after read completion or idling
- ✓ Four-Line Liquid Crystal Display (LCD)
- ✓ Power Supply: 6 AA Alkaline cells
- ✓ Battery Life: Typically 10 hours (continuous operation)
- ✓ Data Transfer: Intrinsically Safe RS232 protocol at 9600 Baud Rate

## Hazardous Area Certification

- ✓ **Model CHECKMATE™ DL-0-Y: Class 1, Zone 2**

  CE compliant (EMC, ATEX)

  ATEX EEx nL IIC T4, Tamb = -20ºC to +50ºC
- ✓ **Model CHECKMATE™ DL-1-Y: Class 1, Zone 1**

  CE compliant (EMC, ATEX)

  ATEX EEx ib IIC T4, Tamb = -20ºC to +50ºC

# Intrinsic Safety

The gas classification IIC is the most stringent including gases such as acetylene and hydrogen. This part of the rating relates to the spark energy that is required to create an explosion.

Gases have a separate classification for explosive tendency based on hot surface temperatures which are not necessarily the same as the spark ignition energy. The temperature rating T4 indicates that no temperature of the equipment exceeds $135^0$C at $50^0$C ambient temperature even under fault conditions. This rating includes all listed gases except carbon disulfide (which requires T5 rating)

Care must be taken with intrinsically safe systems to maintain their carefully designed integrity. The major features to note:

1. The instrument is intrinsically safe when used with six 1.5V, size AA alkaline batteries: Duracell MN1500, Energizer E91 or EN91, or Ray-O-Vac 815. **Batteries must be changed only in a non-hazardous area**. Do not mix batteries of different age or part number.

2. **Absolutely no substitution of parts or unauthorized repairs may be undertaken or the certifications are rendered invalid.**

3. **Only the intrinsically safe cables provided by Rohrback Cosasco Systems, Inc. should be used between the instrument and the PC (even when in safe areas). This prevents any excess power from being passed onto the instrument, which could then be carried into the hazardous area.**

# Chapter 3
# Basics of Checkmate DL

## Contents and Unpacking

Carefully remove the instrument from its package. Included in the package you should find:

- ✓ Checkmate DL Instrument (P/N 723701-0)
- ✓ 6 AA batteries
- ✓ CD-ROM (P/N 723728) that contains
  - ➢ Checkmate DL User Manual
  - ➢ Corrdata Plus® Corrosion Management Software and User Manual
  - ➢ Microcor® Tools Software and User Manual
  - ➢ Corrdata® CSV PC Software and Manual
- ✓ Converter, USB to RS232 (P/N 090753)
- ✓ Adapter, DB25 to DB9 (P/N 748072)
- ✓ Cable Assembly for Microcor ML-9500A Data Logger (P/N 748206)
- ✓ Cable Assembly for Microcor ML-9500B Data Logger (P/N 748241)
- ✓ Cable Assembly for Checkmate DL to Computer (P/N 723725)
- ✓ Cable Adapter for Checkmate DL to RDC (P/N 723623)
- ✓ Carrying Case (P/N 723624)
- ✓ Printed Copy of the Checkmate DL Manual (723700-Manual)

Each Checkmate DL instrument is carefully tested, inspected and packaged prior to shipment. While unpacking the instrument, please inspect the packaged materials for shipping damage and retain all damaged packing/packaged materials to support any claim against your freight carrier should this become necessary.

## Battery Installation

The Checkmate DL is supplied with six 1.5 Volt AA alkaline batteries. Batteries must be installed only in a non-hazardous area. To install these batteries, remove the rear

access panel of the unit (see Figure 3.1) with the Allen wrench provided and install the batteries with the polarities as indicated on the unit.

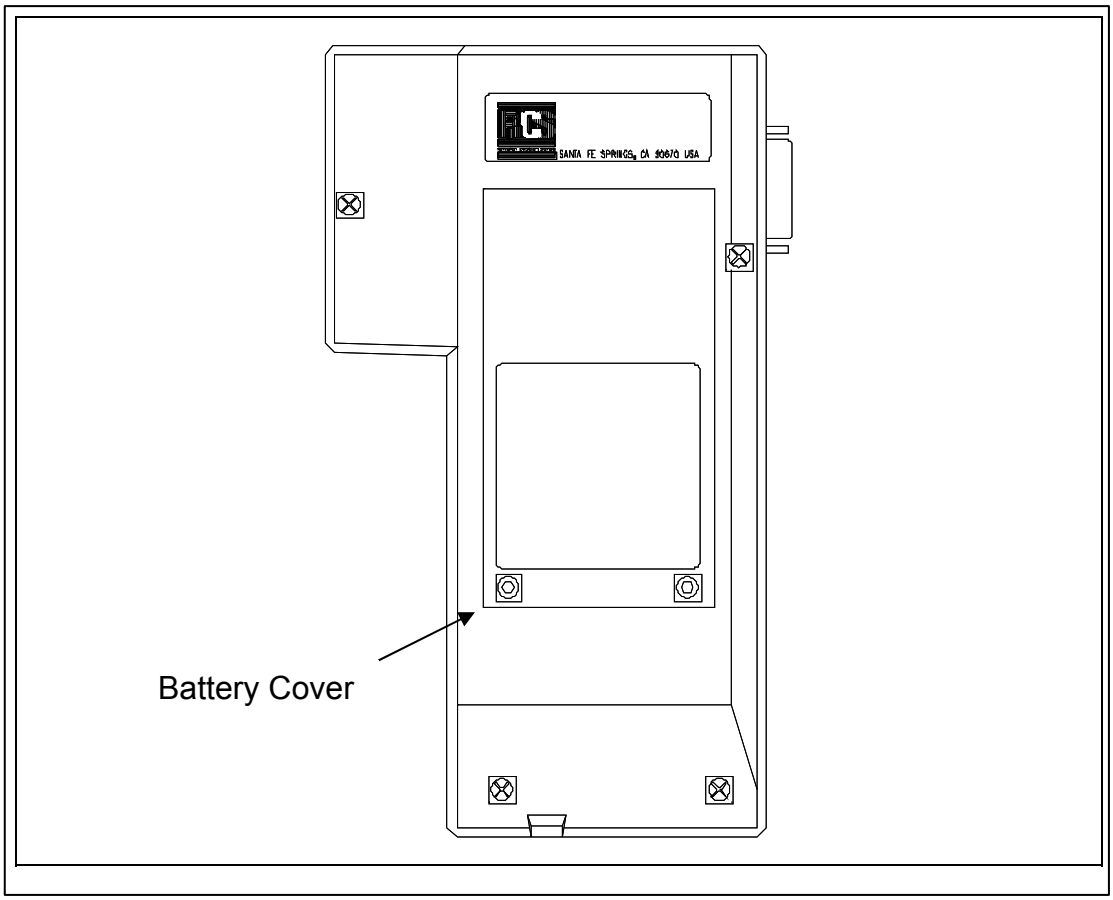



**Figure 3.1 Battery Cover of Checkmate DL Instrument**

Lithium batteries mounted internally provide alternate power to retain the configuration and stored data readings when the primary batteries cease. These batteries should provide 7-10 years of backup capacity. Replacement of these batteries requires the unit to be returned to Rohrback Cosasco Systems or an authorized dealer.

***WARNING!*** **Batteries must be changed only in a non-hazardous area**.

# Checking Battery Status

To check that the unit is operational, press the **ON** key. The following screen should appear:

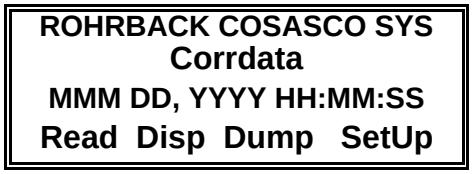
| **Checkmate DL Ver x.xx**<br><br>**Checking BATTERIES**<br>**Please Wait!** |
|---|

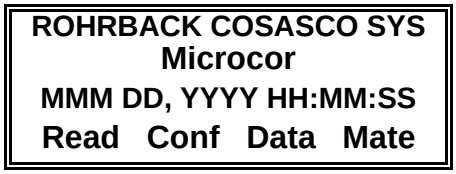
If the batteries are low or in need of replacement, a warning screen will appear as shown below. Proceed to a safe area and replace the batteries as indicated on the **Battery Installation** section.

If the batteries are good, the instrument will proceed to one of the **Standby** displays.

# Standby Screens of Checkmate DL

The **Standby** screens are shown below. For Microcor systems, two additional screens are displayed prior to entering the **Standby** screen.

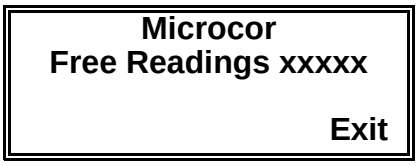


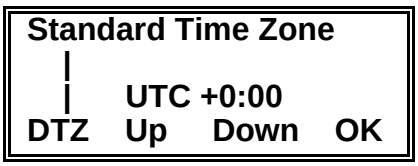

If the Checkmate DL is programmed for Microcor Systems, the Checkmate DL will display the **Microcor Free Readings** and then the **Time Zone** screens shown below.

# Available Memory Space and Standard Time Zone

The **Microcor Free Readings** and the **Time Zone** screens are shown below. The first of the two screens displays the remaining available space for data transferred into the unit.




Press **Exit (F4)** to proceed to the next screen shown below:




It is required to set the **Time Zone** into the Checkmate DL from this screen to configure the Checkmate DL to accurately date and time stamp the readings acquired from the Data Loggers. Set the **Time Zone** to either **Standard** or **Daylight** mode on the

Checkmate DL by pressing **DTZ (F1)** to toggle between **Standard** and **Daylight** (the active mode is shown on the top line of the display). Then use the **Up (F2)** or **Down (F3)** buttons to set the UTC offset for the time zone where the data loggers are located. The correct time zone data is required because the underlying architecture the Microcor Tools Software is based on uses a UTC time reference. UTC (GMT) time information is found on computers in the 'Date and Time' settings in Control Panel on Windows Operating Systems.

> ***NOTE:*** **If the clock time on probe readings is incorrect by up to 36 hours, check that the Checkmate DL is set to the correct time zone. This may be done manually from the "Time Zone" screen shown above.**

# Checkmate DL Keypad

The Checkmate DL features a keypad with 34 keys for the alphabet A through Z and numerals 0 through 9. The numerals are shared with letters F through P and S. Switch between these letters and numbers using the **Alpha/Numeric** key. There are also four soft keys, F1 through F4 (as shown below). The soft keys are multi-function keys used to make on-screen selections.

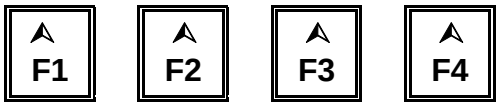
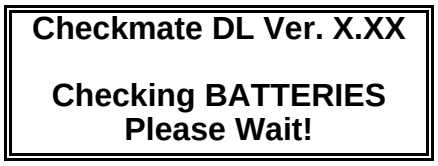


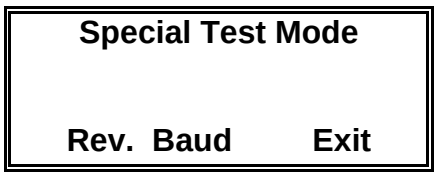

**Figure 3.2 Checkmate DL Function Keys**

# Checkmate DL Firmware Version

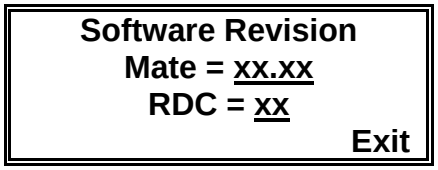
The Checkmate DL firmware version is displayed on the first screen of the instrument when it is turned on regardless of the data collection system.




It is also possible to access the Checkmate DL firmware version when the it is programmed for Corrdata Systems. Press the **Read (F1**) from the **Standby** display and select **Mode (F2)** from the **What To Read?** display to go to the **Special Test Mode** display:



Press **Rev. (F1)** for the revision information display:

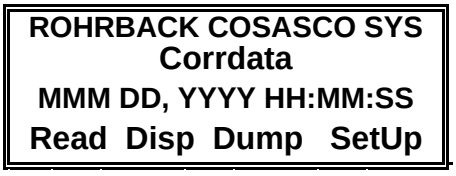


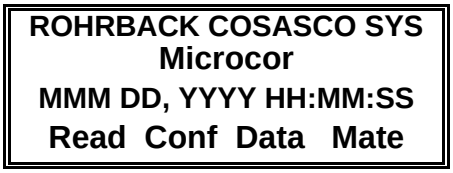

If the Checkmate DL is connected to a RDC it will display the firmware version of the RDC along with the firmware version of the Checkmate DL.

# Standby Display Screens for Microcor and Corrdata Systems

The Checkmate DL handheld instrument can be conveniently switched between Corrdata and Microcor Systems with only a few keypad entries.

The **Standby** display screen for the Microcor System and the Corrdata System is shown below:



# Chapter 4
# Initializing Checkmate DL to Work with Corrdata System

## Configuring Checkmate DL for Corrdata Systems

If the Checkmate DL is programmed for the Microcor System, it can be easily changed to the Corrdata System as described below.

> ***WARNING!*** ***When switching Checkmate DL between Microcor and Corrdata Systems, all stored data will be erased! Be sure to transfer all stored data to the PC prior to changing the data collection system (see appropriate chapters for more details on data transfer).***

From the **Standby** display, press **Mate (F4**) then select **Mate Type (F3)** from the **Mate Functions** display. Press **Yes (F1)** to change the Checkmate DL from Microcor technology to Corrdata technology.

## Setting the Time and Date

The Checkmate DL has its own internal clock so that individual probe readings are automatically time and date stamped.

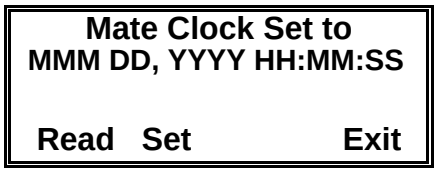
To set the internal clock Time and Date, from the **Standby** display, press **SetUp (F4**) then select **Mate (F1)** from the **Configuration Options** display to go to the **Mate Configuration** display:

| **Mate Configuration** | | | |
|---|---|---|---|
| **PC Conf** | **Man Conf** | **Set Mate** | **Exit** |

Press **Set Mate (F3)** to go to the **Mate Settings** display:

| **Mate Settings** | | | |
|---|---|---|---|
| **Set Units** | **Set Time** | **Clr Mem** | **Exit** |

Press **Set Time (F2)** to go to the **Mate Clock** display:



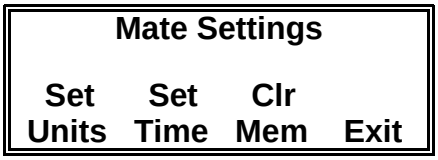

Press **Set (F2)** to go to the **Set Mate Date & Time** display:

From the keyboard, enter the last two digits of the year followed by the two digit number of the month, date, the time in hours, minutes and seconds (enter 00 for seconds for convenience). When the time is set correctly, press **Enter (F1)** to start the clock. To update the clock on the **Mate Clock Set To** display, press **Read (F1)**.

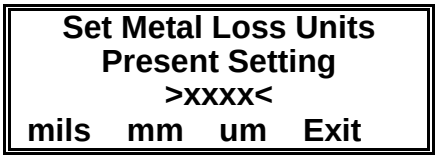
> ***NOTE:*** ***The time protocol is based on the military 24 hour clock, where 00:00 hours denote midnight at the start of the day, and 12:00 is noon.***

# Setting the Engineering Units

To set the Engineering Units, from the **Standby** display, press **SetUp (F4**) then select **Mate (F1)** from the **Configuration Options** display to proceed to the **Mate Configuration** display. Press **Set Mate (F3)** to go to the **Mate Settings** display shown below:




Press **Set Units (F1)** to go to the **Set Metal Loss Units** display:




Select the desired units by pressing **mils (F1)** for mils (0.001”) and mils/year or **mm (F2)** for millimeters and mm/year or **um (F3)** for micrometers and um/year.

After the selection is made and correctly displayed on the display, press **Exit (F4)** to set the units and return to the **Mate Settings** display.

# Clearing Memory on Checkmate DL

Normally it will not be necessary to clear the memory on the Checkmate DL unless extraneous entries have been made, for example, when initially experimenting with the system. However, when the equipment is to be transferred to a new location, then it is recommended to clear the memory to avoid confusion with any previously collected data.

> ***NOTE:*** ***All data stored in internal memory of the Checkmate DL will be erased permanently when switching between Microcor and Corrdata Systems. Make sure to transfer stored data to the PC prior to changing the data collection system.***

To clear the memory, from the **Standby** display, press **SetUp (F4**) then select **Mate (F1)** from the **Configuration Options** display to go to the **Mate Configuration** display and press **Set Mate (F3)** to go to the **Mate Settings** display shown below:

| Mate Settings | | | |
|---|---|---|---|
| **Set Units** | **Set Time** | **Clr Mem** | **Exit** |

Press **Clr Mem (F3)** and confirm again on the next screen to clear all memory stored in the instrument.

# Changing the Communication Baud Rate

Under normal circumstances, the baud rate will not need to be changed from the default setting of 9600. If the Down Hole Tool is used, the baud rate should be switched to 300.

To navigate to the **Baud Rate** display, press **Read (F1**) from the **Standby** screen, then select **Mode (F2)** on the **What To Read?** display to advance to the **Special Test Mode** display:

| Special Test Mode | | |
|---|---|---|
| **Rev.** | **Baud** | **Exit** |

Press **Baud (F2)** to modify the baud rate on the following display:

| Baud Rate is XXXX<br>Select 300 for DHT<br>9600 for RDC or PC | | |
|---|---|---|
| **300** | **9600** | **Exit** |

Press **300 (F1)** or **9600 (F2)** to select either the 300 or 9600 baud respectively. Checkmate DL will set the selected baud rate and return to the **What To Read?** display.

# Chapter 5
# Configuring Checkmate DL with RDC Configuration

## Import RDC Configurations to Checkmate DL using a PC and Corrdata Plus

Create the desired **Site**, **Group** and **Probe** list running the Corrdata Plus software program on the PC. To configure the Checkmate DL with the above created probe list; click the **Device Configuration** command button on the Corrdata Plus software program. Choose the **Mate** radio button on the **Select Device** area and select **Checkmate** from the **Select Method** drop down menu. Now, select a complete group or an individual probe from the list to configure the Checkmate DL.

Connect the Checkmate DL to the PC (ensure the correct **port** number is selected).

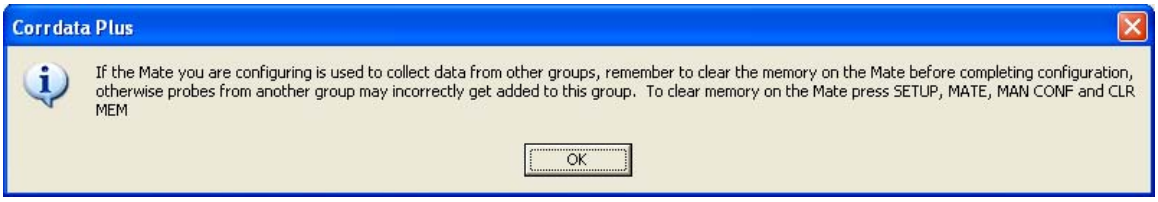
Power the Checkmate DL and from the **Standby** display, press **SetUp (F4**) then select **Mate (F1)** from the **Configuration Options** display to proceed to the **Mate Configuration** display:

| **Mate Configuration** | | | |
|---|---|---|---|
| **PC Conf** | **Man Conf** | **Set Mate** | **Exit** |

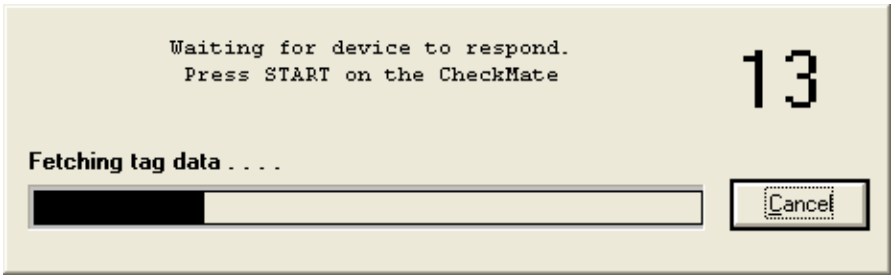
Press **PC Conf (F1)** to enter the following screen:

| **Connect Mate to PC**<br>**PC must be running Corrdata Plus** | |
|---|---|
| **Start** | **Exit** |

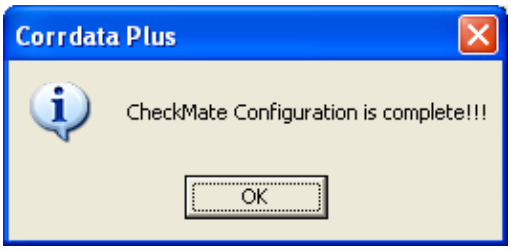
Click the **Configure Device** command button on the Corrdata Plus software program. The following dialogue box may appear:


Corrdata Plus
If the Mate you are configuring is used to collect data from other groups, remember to clear the memory on the Mate before completing configuration, otherwise probes from another group may incorrectly get added to this group. To clear memory on the Mate press SETUP, MATE, MAN CONF and CLR MEM
OK

Select **OK**. The following dialogue box will appear:




Press the **Start (F1)** on the Checkmate DL. Successful configuration will generate "**Checkmate Configuration is complete!!!**" message on the PC as shown below and the Checkmate will automatically return to the **Mate Configuration** display:




If following error messages appear on the Checkmate DL, ensure the Checkmate DL is properly connected to the PC and verify the **port** number is correct. Be sure that the **baud rate** on both the computer and the Checkmate DL are set to 9600 baud.

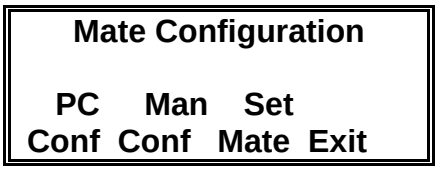
| **WARNING!**<br>**No Response From RDC**<br>**Check Connection**<br>**Exit** |
|---|

| **WARNING!**<br>**Error While Getting**<br>**Data**<br>**Exit** |
|---|

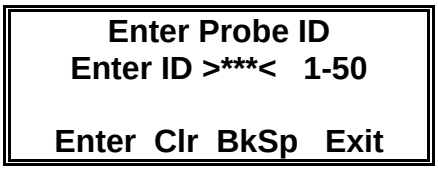
# Manually Set RDC Configurations to Checkmate DL

This section explains the procedure to manually configure the Checkmate DL with the configuration information of Corrosometer or Corrater probes attached to a RDC. Once the RDC information is properly configured in the Checkmate DL, RDC units will need to be programmed. Refer to the **Configuring a RDC Using the Checkmate DL** chapter for more information.

From the **Standby** display, press **SetUp (F4**) then select **Mate (F1)** from the **Configuration Options** display to proceed to the **Mate Configuration** display:

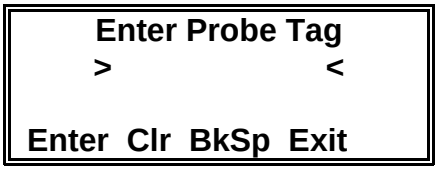



Press **Man Conf (F2)** to proceed to the **Enter Probe ID** display:




Enter a number from 1 to 50 and press **Enter (F1)** to go to the **Enter Probe Tag** display. If an invalid ID is entered, it is automatically cleared upon pressing **Enter (F1)**, enter a valid ID and retry. If the ID selected has already been configured, the **This ID Already Configured** display appears:

Pressing **Exit (F4)** returns the instrument to the **Configuration Options** display. Press **Try Again (F2)** to return to the **Enter Probe ID** display or **Cont (F1)** to continue to the **Enter Probe Tag** display and reconfigure the ID:

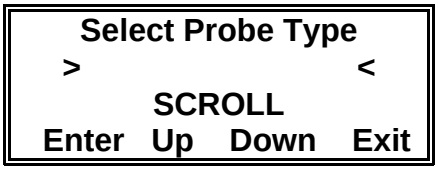






In the **Enter Probe Tag** display, enter up to twelve (12) alpha/numeric characters to uniquely identify the monitoring location. This can be a tag number, location or process name. Pressing **Clr (F2)** clears a previously entered ID. Pressing **BkSp (F3)** backs up one space for each time it is pressed so that a change can be made. Pressing **Exit (F4)** returns to the **Configuration Options** display.

Press **Enter (F1)** to go to the **Select Probe Type** display:







The available probe type selections are **W80 WIRE**, **W65 WIRE**, **W45 WIRE**, **W40**

**WIRE**, **TF50**, **TF5**, **T50 CYLINDRICAL**, **T20 CYLINDRICAL**, **T10 CYLINDRICAL**, **T8 TUBE LOOP**, **T4 TUBE LOOP**, **S50 FLUSH**, **S40 FLUSH**, **S20 FLUSH**, **S10 FLUSH**, **S8 STRIP LOOP**, **S8 FLUSH**, **S4 STRIP LOOP**, **S4 FLUSH**, **S4 ATMOSPHERIC**, **CORRATER, CORRATER FLUSH, OTHER** and **TEST PROBE CO**.

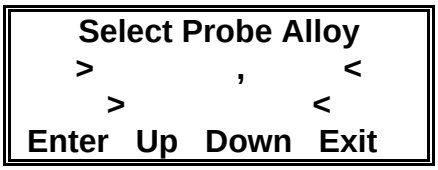
> ***NOTE:*** ***See more details on selecting "OTHER" probes towards the end of this section.***

It is possible to scroll up through the list by repeatedly pressing the **Up (F2)** key or down through the list by repeatedly pressing the **Down (F3)** key. When the desired probe element is displayed, press the **Enter (F1)** key to accept the selection.

If a TF5 or TF50 high sensitivity atmospheric CORROSOMETER probe has been selected, the Checkmate DL will go to a special **Enter Probe Span** display:

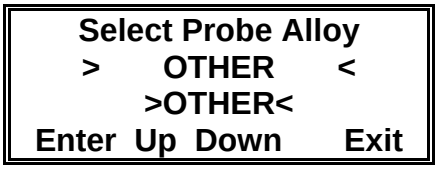
Using the numeric portion of the keypad, enter the probe span in Angstroms (Á). The packaging for the TF5 and TF50 CORROSOMETER provides the specific span for the probe. If the specific span data is not available, the nominal span can be used without appreciable error.

If a Corrater or Corrater Flush probe has been selected, the Checkmate DL will proceed to a special **Select Probe Alloy** display:

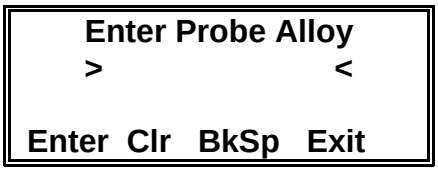



It is possible to scroll up through the list by repeatedly pressing the **Up (F2)** key or down through the list by repeatedly pressing the **Down (F3)** key. When the desired probe element is displayed, press the **Enter (F1)** key to accept the selection.

Select **OTHER** (see below) if no default selection applies to the probe being used.



Pressing the **Enter (F1)** key will advance the display to the **Enter Probe Alloy** display:




The **Enter Probe Alloy** display allows the user to enter up to eight (8) alpha/numeric characters to identify the alloy of the probe element for reference purposes only. It does not affect the corrosion rate calculation.

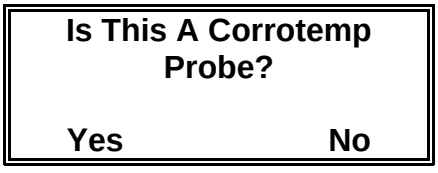
Press **Enter (F1)** again to go to the **Enter Alloy Mult** display:

Enter the Alloy Multiplier for the probe. Refer to Table 5.2 Alloy Multipliers for more details.

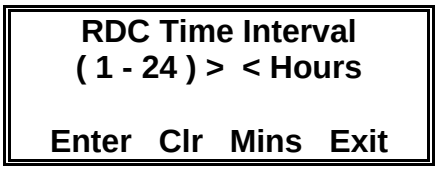
If a CORROSOMETER probe (element) is selected, the above steps are bypassed and the Checkmate DL will automatically proceed to the **Enter Probe Alloy** display:

The **Enter Probe Alloy** display allows the user to enter up to eight (8) alpha/numeric characters to identify the alloy of the probe element for reference purposes only. It does not affect the calculation of corrosion rates.

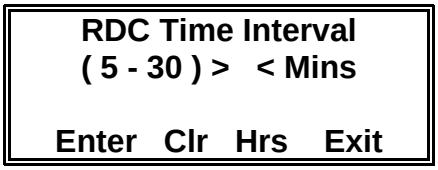
Press the **Enter (F1)** key to advance to the next display shown below:




Make the appropriate selection, Checkmate DL will proceed to the next display:

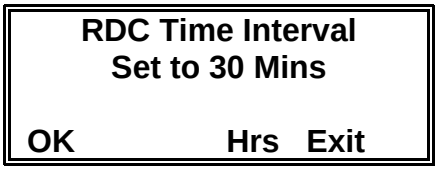



Key in the desired read time interval for RDC readings (default selection is presented in hours) and press **Enter (F1)**. Pressing the **Enter (F1)** without specifying a value will default the read interval to One (1) hour. Press the **Mins (F3)** key to change the time interval selection to minutes (shown below):

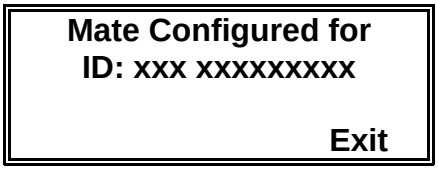



Key in the desired minute read interval and press the **Enter (F1)** key to advance to the next display. Pressing the **Enter (F1)** without specifying a value will default the read interval to five (5) minutes. The minimum read time interval for a Four (4) Channel RDC is 15 minutes. Although Corrosometer probes attached to RDC – COT may be set up to have a 5 minute read time interval, 4 Channel RDC will change the read time to 15 minutes (RDC – COT (one channel) will retain the 5 minute read interval).

The minimum read time interval offered for Corrater and Corrater Flush probe is 30 minutes. In this case, choosing **Mins (F3)** will show the following display. Press **OK (F1)** to accept, **Hrs (F3)** to return to hourly **RDC Time Interval** display, or **Exit (F4)** to exit to **Configuration Options** screen:




Once the appropriate selections are made, the following display will appear indicating the Checkmate DL was successfully configured. Press the **Exit (F4)** key to return to the **Standby** screen:




If **OTHER** is selected from the probe type selections on the **Select Probe Type** display, the Checkmate DL will proceed to the **Enter Probe Type** display shown below:

| Enter Probe Type > < |
|---|
| (A thru G) |
| Type |
| Enter Clr List Exit |

Enter **A** for Wire Loop type probes or enter **B** or **C** for Tube Loop/Strip Loop type probes or enter **D** for Cylindrical type probes or **E** for Corrater probes or **F** for Corrater Flush probes or **G** for High Sensitive Probes. If you are unsure of the element type, this information can be found on the probe packaging, etched on the probe body adjacent to the connector or in Table 5.1 Probe Type Identification.

Make the Probe Type selection and press **Enter (F1)**. Following **Enter Probe Span** display will appear if type **A**, **B**, **C**, or **D** is selected:

| Enter Probe Span |
|---|
| > < mils |
| Enter Clear BkSp Exit |

From the keypad, enter the span of the probe element in **mils**. The span in mils is shown on the probe packaging or it can be found in Table 5.1.

If Type **G** for the Model 610 Atmospheric Probes is selected, the span is entered in Angstroms, see the following **Enter Probe Span** display:

| Enter Probe Span |
|---|
| > < Angstroms |
| Enter Clear BkSp Exit |

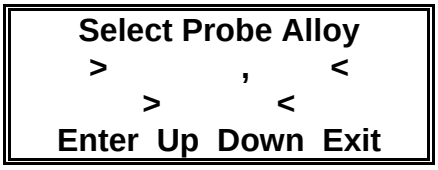
Once the span is entered, press the **Enter (F1)** key to proceed to the **Enter Probe Alloy** display:

| Enter Probe Alloy |
|---|
| > < |
| Enter Clr BkSp Exit |

The **Enter Probe Alloy** display allows the user to enter up to eight (8) alpha or numeric characters to identify the alloy of the probe element for reference purposes only. It does not affect the calculation of corrosion rates. At this point, the Checkmate DL will proceed to the **Is This A Corrotemp Probe?** display. Make the appropriate selection, **Yes (F1)** or **No (F4)**. Checkmate will proceed to the **RDC Time Interval** display; make the appropriate selection to advance to the next screen. Checkmate DL will automatically proceed to conclude the configuration process. Scroll up in this section (**Manually Configuring a Corrosometer or Corrater Probe attached to a RDC**) for step by step

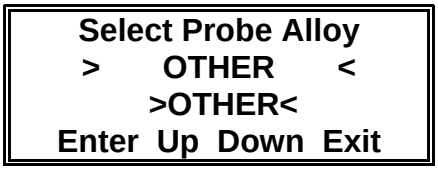
illustrated descriptions.

If type **E** or **F** is selected, following **Select Probe Alloy** display will appear:

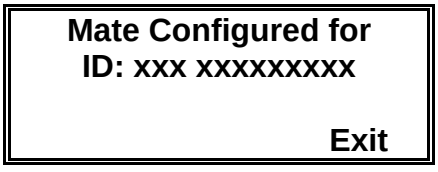



Scroll up or down through the list by repeatedly pressing the **Up (F2)** key or the **Down (F3)** key. When the desired probe element selection is displayed, press the **Enter (F1)** key to accept the selection. Next screen (**Is This A Corrotemp Probe?**) will prompt to choose **Yes (F1)** or **No (F4)**. Make the appropriate selection. Checkmate DL will proceed to the **RDC Time Interval** display; make the appropriate selection to advance to the next screen. Checkmate DL will automatically proceed to conclude the configuration process. Scroll up in this section (**Manually Configuring a Corrosometer or Corrater Probe attached to a RDC**) for step by step illustrated descriptions.

If **OTHER** is selected in the **Select Probe Alloy** display as shown below, pressing the **Enter (F1)** key will advance the display to the **Enter Probe Alloy** screen. The **Enter Probe Alloy** display allows the user to enter up to eight (8) alpha/numeric characters to identify the alloy of the probe element for reference purposes only. It does not affect the calculation of corrosion rates. Press **Enter (F1)** again, follow the prompts and enter the necessary values to conclude the configuration process. Scroll up in this section (**Manually Configuring a Corrosometer or Corrater Probe attached to a RDC**) for step by step illustrated descriptions.




Checkmate DL is successfully configured when the following display appears:




Press **Exit (F4)** to return to the **Standby** screen.

| CORROSOMETER or CORROTEMP Probe Element | Type | Span (mils) |
|---|---|---|
| Strip Loop S4 | C | 1 |
| Flush Element S4<br>Atmospheric Element S4<br>Strip Loop S8<br>Tube Loop T4 | B<br>D<br>C<br>B | 2 |
| Flush Element S8<br>Atmospheric Element S8<br>Tube Loop T8 | B<br>D<br>B | 4 |
| Flush Element S10<br>Cylindrical Element T10 | B<br>D | 5 |
| Flush Element S20<br>Cylindrical Element T20<br>Wire Loop Element W40 | B<br>D<br>A | 10 |
| Wire Loop Element W45 | A | 11.25 |
| Flush Element S20<br>Wire Loop Element W80 | B<br>A | 20 |
| Cylindrical Element T50 | D | 25 |

**Table 5.1 CORROSOMETER and CORROTEMP Probe Types and Spans**

***Note:*** ***CORROSOMETER Model 2500, 3500, or 4500 probes are designated as a "cylindrical" element, not as "tube" element which refers only to "tube loop" elements.***

| UNS Code | Material | Multiplier |
|---|---|---|
| K03005 | Pipe Grade Carbon Steel | 1.00 |
| A91100 | Aluminum 1100-0 | 0.94 |
| A92024 | Aluminum 2024 | 0.88 |
| C11000 | Copper 110 ETP Comm. Pure | 2.00 |
| C44300 | CDA 443 Arsenical Admiralty | 1.67 |
| C44500 | CDA 445 Phosphorized Adm. | 1.68 |
| C64200 | CDA 642 A1 Silicon Bronze | 1.48 |
| C68700 | CDA 687 Alum. Brass Arsenical | 1.62 |
| C70610 | CDA 706 90/10 Copper/Nickel | 1.80 |
| C71500 | CDA 715 70/30 Copper/Nickel | 1.50 |
| G41300 | AISI 4130 Alloy Steel | 1.00 |
| L50045 | Lead | 2.57 |
| N04400 | Monel 400 Nickel | 1.13 |
| N05500 | Monel K-500 Nickel | 1.04 |
| N06022 | Hastelloy C22 | 0.85 |
| N06600 | Inconel 600 Nickel | 0.95 |
| N08020 | Carpenter 20 CB3 SST | 0.98 |
| N08800 | Incolloy 800 | 0.89 |
| N08825 | Incolloy 825 | 0.88 |
| N10276 | Hastelloy C276 | 0.86 |
| R50400 | ASTM B-348 Grades 2-4 Titanium | 0.75 |
| S30400 | AISI 304 Stainless Steel | 0.89 |
| S31600 | AISI 316 Stainless Steel | 0.90 |
| S31603 | AISI 316L Stainless Steel | 0.90 |
| S31803 | 2205 Duplex Stainless Steel | 0.89 |
| S32750 | 2507 Duplex Stainless Steel | 0.88 |
| Z17001 | Grades 1A, 1, 2, 3, or 5 Zinc | 1.29 |

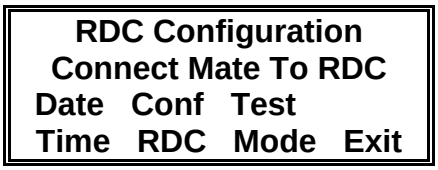
***<u>Note:</u> These factors are recommended for the MULTIPLIER values. They are based on use of CORRATER electrodes which have surface areas of 5cm$^2$ for "standard" probes and 0.5 cm$^2$ for "flush" probes.***

**Table 5.2 Alloy Multipliers**

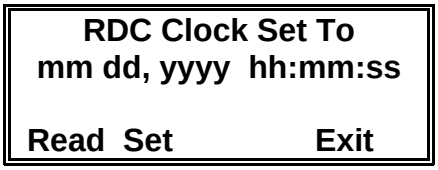
# Chapter 6
# Configuring a RDC Using Checkmate DL

## Setting the Date and Time on RDCs

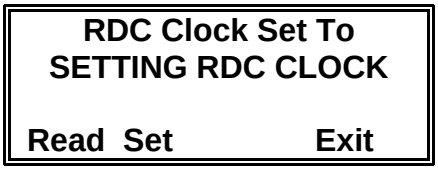
From the **Standby** display, press **SetUp (F4**) then select **RDC (F2)** from the **Configuration Options** display to proceed to the **RDC Configuration** display:




Press **Date Time (F1)** and the following screen will appear:




Press **Set (F2)**. The **RDC Clock Set To** display will change to show:



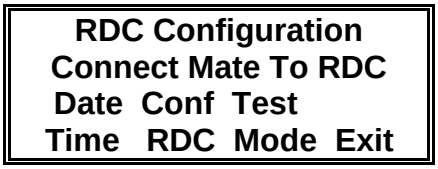

The RDC internal clock will be synchronized with the Checkmate DL clock. Press **Read (F1)** to verify the time of the RDC. Press the **Exit (F4)** to return to the **RDC Configuration** display.

If the following message appears, check to ensure the validity of the connection.

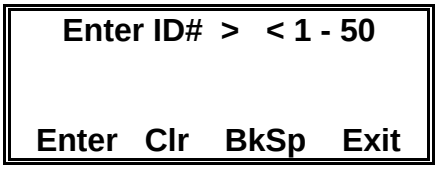
# Configure a RDC using the Checkmate DL

Checkmate DL is designed to configure and gather data from all RDCs. Refer to **Reading a Remote Data Collector (RDC)** section for more details on reading RDCs. This section will explain the configuration procedure of a RDC from a Checkmate DL.

To begin the configuration process, connect the Checkmate DL to the RDC with the provided LEMO connector. Power-on the Checkmate DL. Press **SetUp (F4)** from the **Standby** display and then select **RDC (F2)** from the **Configuration Options** display to proceed to the **RDC Configuration** display:




Press the **Conf RDC (F2)** to proceed to the following screen:




Enter the ID number (1 – 50) using the numeric keys of the Checkmate DL. In order to configure the RDC, the probe must be already programmed in the Checkmate DL. Refer to the **Manually Configuring a Corrosometer or Corrater Probe attached to a RDC** section or **Probe Configuration using a PC and Corrdata Plus Software** section in the **Probe Configuration** chapter for more details.

If the probe is not properly configured in the Checkmate DL before configuring the RDC, the following error message will display:

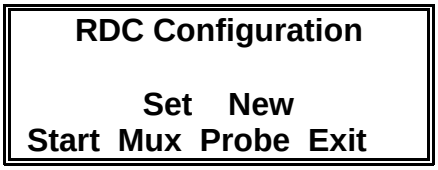
Press **Exit (F4)** once to enter the **RDC Configuration** display and press the **Conf RDC (F2)** to enter a different ID. If it is desirable to configure the above ID, press **Exit (F4)** continuously to return to the **Standby** display and configure the ID by navigating to the appropriate displays, and try again.

If the connection between the RDC and the Checkmate DL is interrupted or invalid, the following display will appear:

Press the **Exit (F4)** key to return to the **Configuration Options** display. Select **RDC (F2)** to go to the **RDC Configuration** display and repeat the above process with the connection properly established.

If either of the following error messages appears, verify the **Probe Type** configured for the RDC. RDC – CO (Corrosometer) and RDC – CA (Corrater) technologies require different probe configurations. Refer to the **Manually Configuring a Corrosometer or Corrater Probe attached to a RDC** section or **Probe Configuration using a PC and Corrdata Plus Software** section in the **Probe Configuration** chapter for more details.

Upon successful entry of the ID, the following **RDC Configuration** display will appear:

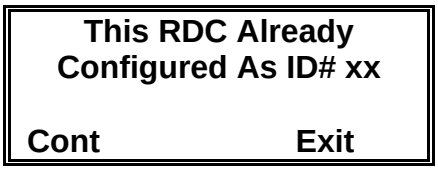



Press **Start (F1)** to configure the RDC.

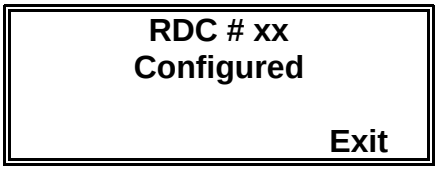
If the connection between the RDC and the Checkmate DL is interrupted, the following display will appear:

Verify the connection by checking the LEMO connector cable between the Checkmate DL and the RDC. Press **Exit (F4)** and retry.

If the RDC was previously programmed, Checkmate DL will proceed to the following display:




If replacing the existing ID with the new configuration is desired, press **Cont (F1)** (see display below), otherwise **Exit (F1)** to return to the **RDC Configuration** display to begin configuration of a different ID:




Press **Exit (F4)** to return to the **Configuration Options** display.

For Four (4) Channel RDC units, each probe configuration (channel) must be individually configured. Follow the procedure above to configure the first channel. At the completion of the above procedure, the Checkmate DL should be at the **Configuration Options** display. Now, press **RDC (F2)** to proceed to the **RDC Configuration** display and repeat the procedure to configure the remaining channels. Also refer to the **Configuration of 4 Channel RDC** section below**.** The minimum read time interval for a Four (4) Channel RDC is 15 minutes. Although Corrosometer probes attached to RDC – COT may be set up to have a 5 minute read time interval, 4 Channel RDC will change the read time to 15 minutes (RDC – COT (one channel) will retain the 5 minute read interval).

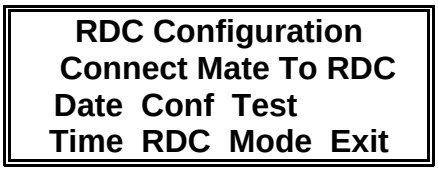
> ***NOTE:*** ***RDC units will not collect data while the Checkmate DL is connected. Make sure to unplug the Checkmate DL from the RDC to begin data collection cycle.***

# Updating RDC Configuration upon Probe Replacement

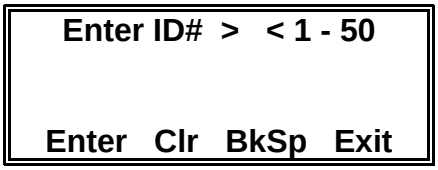
The initial **Check** reading can be reset easily on the RDC when a probe is replaced. The **Check** reading is a measure of probe functionality or integrity. The initial value for CORROSOMETER probes is 800 ±50 divisions. It is recommended that a **Check** reading be taken and recorded immediately after unpacking a probe as it will be the value to which all subsequent **Check** readings will be compared. The general rule is that the **Check** reading should not vary by more than 1% (±10 divisions) from the initial value. A change greater than 1% indicates a compromise in the probe integrity and replacement is required.

To reset the **Initial Check** reading, connect the Checkmate DL to the RDC with the provided LEMO connector cable and power up the Checkmate DL. Press **SetUp (F4)**

from the **Standby** display and then select **RDC (F2)** from the **Configuration Options** display to proceed to the **RDC Configuration** display:



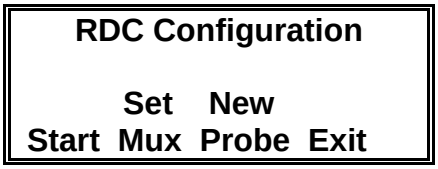

Press the **Conf RDC (F2)** to proceed to the following screen:



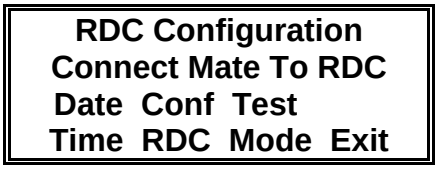

Enter the ID number (1 – 50) using the numeric keys of the Checkmate DL. Press the **Enter (F1)** key.

> ***NOTE:*** ***Refer to the "Configure a RDC Using the Checkmate DL" section above for any Warning and/or Error messages.***

Press **New Probe (F3)** to reset the Initial Check reading on the following display:




Checkmate DL will return to the following display after resetting the **Check** value:




# Configuration of 4 Channel RDC

When initially configuring the 4 Channel RDC, it will begin at channel 1 and proceeds through to channel 4, and then wrap around to channel 1 again. This may not be suitable when less than four channels are to be configured, or when one or more channels are to be reconfigured. The Checkmate DL allows users to select any one of

the channels on the 4 Channel RDC and also allows switching **ON** or **OFF** of any of the channels without losing the configuration information.

> ***WARNING!*** ***When re-configuring any channel, previously saved data on all the other channels will be erased and a new data collection run commenced. Therefore all the data from the other channels MUST be collected BEFORE any channel is reconfigured to AVOID LOSS OF DATA.***

To select, deselect or set as active a channel, connect the Checkmate DL to the RDC with the provided LEMO connector cable and power up the Checkmate DL. Press **SetUp (F4)** from the **Standby** display and then select **RDC (F2)** from the **Configuration Options** display to go to the **RDC Configuration** display:

| **RDC Configuration** |
|---|
| **Connect Mate To RDC** |
| **Date Conf Test** |
| **Time RDC Mode Exit** |

Press the **Conf RDC (F2)** and the following screen will appear:

| **Enter ID# > < 1 - 50** |
|---|
| |
| **Enter Clr BkSp Exit** |

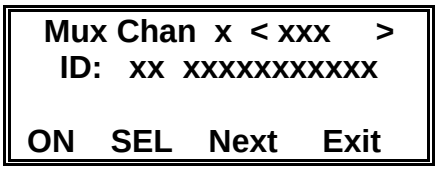
Enter the ID number (1 – 50) using the numeric keys of the Checkmate DL. Press the **Enter (F1)** key.

> ***NOTE:*** ***Refer to the "Configure a RDC Using the Checkmate DL" section above for any Warning and/or Error messages.***

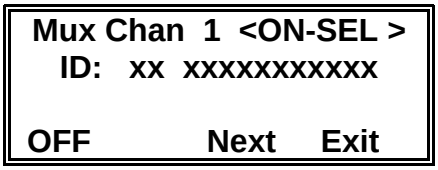
Press **Set MUX (F3)** on the following display:

| **RDC Configuration** |
|---|
| |
| **Set New** |
| **Start Mux Probe Exit** |

This will advance the Checkmate DL to the following display:




The first line shows the selected channel and its status inside the **< >** symbols. The **ON (F1)** key is a multifunctional key that alternates back and forth with **OFF (F1)**. Selecting **ON (F1)** on channel 1 and pressing the **SEL (F2)** will depict the following display:




Channel 1 is switched **ON** and is currently **SELECTED** to transmit data or receive any instructions from the Checkmate DL. Press **OFF (F1)** to suspend the data collection from this channel if desired. If this channel is not currently **SELECTED**, only **"ON"** will appear in the status area (channel is active, but not selected to receive instructions or transmit data). Pressing **Next (F3)** will advance the Checkmate DL to the next channel. It is possible now to make changes to this channel using the **F1** and/or **F2** keys. **Next (F3)** key will proceed through to the next channel and wrap around to the first channel.

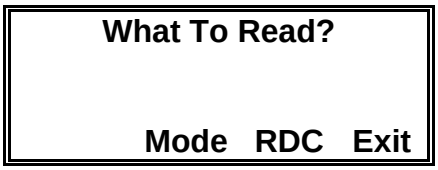
Press the **Exit (F4)** button to return to the **RDC Configuration** display.

# Chapter 7
# Reading a RDC with the Checkmate DL

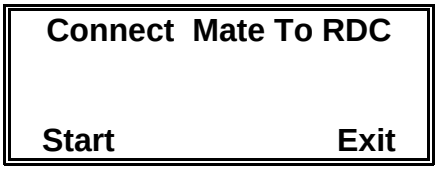
The Checkmate DL is designed to configure and gather data from all RDCs. Refer to **Configure a RDC using the Checkmate DL** section for more details on configuring RDCs. The following section will explain the RDC data collection procedure.

## Data Collection from a RDC

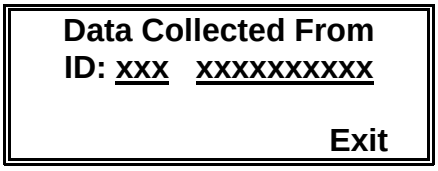
To read a RDC, connect the Checkmate DL to the RDC with the LEMO connector cable. From the **Standby** screen, press **Read (F1)** to proceed to the **What To Read?** display:




Press **RDC (F3)** to proceed to the **Connect Mate To RDC** display:




Press **Start (F1)** to begin reading data from the RDC. When the data collection is successfully completed, the Checkmate DL will advance to the display shown below:




For Four (4) Channel RDC units, four readings must be taken to collect the data from the four attached probes. From the **Connect Mate To RDC** display press **Start (F1)** to read the first probe. Once that is successfully completed, press the **Exit (F4)** from the **Data Collected From** display to advance to the **Connect Mate To RDC.** Press **Start (F1)** and repeat to collect data from the remaining 3 probes.

Unsuccessful data read attempts will cause the unit to display any of the following error messages:

| Error Downloading | WARNING! | WARNING! |
|---|---|---|
| | RDC Not Configured | No Response From RDC |
| | | Check Connection |
| Exit | Exit | Exit |

Verify the RDC is properly configured. Inspect the data cable for proper connection to the RDC and the Checkmate DL. Replace the RDC battery if required. Try again.

# Reading the RDC Configuration Details

From the **Standby** display, press **SetUp (F4**) then select **RDC (F2)** from the **Configuration Options** display to proceed to the **RDC Configuration** display:

| RDC Configuration | | | |
|---|---|---|---|
| Connect Mate To RDC | | | |
| Date | Conf | Test | |
| Time | RDC | Mode | Exit |

Press **Test Mode (F3)** to enter the following **RDC Test Mode** display:

| RDC Test Mode | | | |
|---|---|---|---|
| Read | | | |
| Test | Read | Read | |
| Probe | Conf | Time | Exit |

Press **Read Conf (F2)** key to enter the following display with the configuration details:

| ID: xx xxxxxxxxxxxx |
|---|
| Type: xxxxxxxxxxx |
| Alloy: xxxxxxxxxx |
| Exit |

The **ID:** line displays the ID number assigned to the RDC and the Probe Tag. The **Type:** line displays the Probe Type. Press **More (F4)** to advance to the following screen:

| Interval: xxx |
|---|
| Num Readings: xx |
| Next Read: hh:mm:ss |
| Exit |

The **Interval:** line displays the probe read time interval in minutes or hours as configured. The **Num Readings:** line displays the number of readings taken thus far by

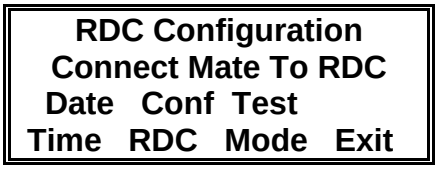
the RDC with the current configuration. The **Next Read:** line displays the time when the next data collection cycle will begin.

Press **Exit (F4)** once to return to the **RDC Test Mode** display or continuously to return to the **Standby** display.

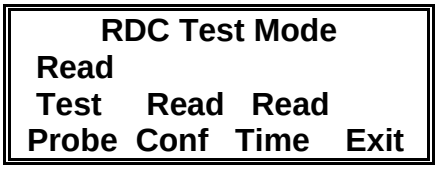
If the following message appears, check the connection between the Checkmate DL and the LEMO connector cable. Pressing **Exit (F4)** will return the Checkmate DL to the **Configuration Options** display, select **RDC (F2)** to advance to the next display. Press **Test Mode (F3)** to re-enter the **RDC Test Mode** display and retry.

# Reading the Programmed Date and Time on the RDC

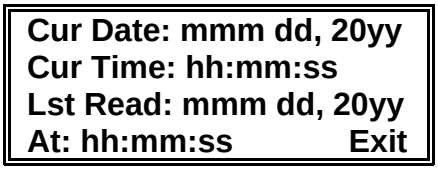
From the **Standby** display, press **SetUp (F4**) ant then select **RDC (F2)** from the **Configuration Options** display to proceed to the **RDC Configuration** display:




Press **Test Mode (F3)** to enter the following **RDC Test Mode** display:




Press **Read Time (F3)** key to enter the following display with the Date and Time details:




The **Cur Date:** line displays the current date while the **Cur Time:** displays the time in military 24 hour time, where 00:00 hours denotes midnight at the start of the day, and

12:00 is noon. **Lst Read:** line displays the date of the last reading performed while **At:** displays the time of that reading.

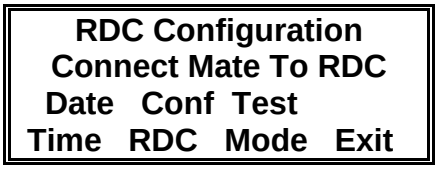
Press **Exit (F4)** once to return to the **RDC Test Mode** display or continuously to return to the **Standby** display.

If the following message appears, check the LEMO cable connection. Pressing **Exit (F4)** will return the Checkmate DL to the **Configuration Options** display, select **RDC (F2)** to advance to the next display. Press **Test Mode (F3)** to enter the **RDC Test Mode** display and retry.

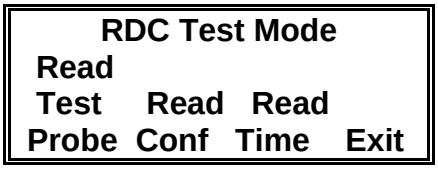
# Perform a "Test Read" on a RDC

It is possible to perform a test reading on a RDC from a Checkmate DL to verify the proper setup of the RDC and the validity of the cable connectivity in the field. In order for this test reading, a test probe or special probe is required.

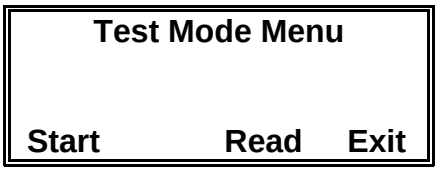
From the **Standby** display of the Checkmate DL, press **SetUp (F4**) and then select **RDC (F2)** from the **Configuration Options** display to go to the **RDC Configuration** display:




Press **Test Mode (F3)** to enter the following **RDC Test Mode** display:

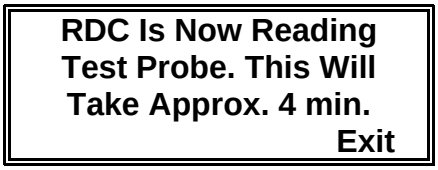



Press **Read Test Probe (F1)** key to enter the following display:




A test probe must be attached to the RDC before pressing **Start (F1)**. Pressing **Start**

**(F1)** will advance the Checkmate DL to the following display:




Press the **Exit (F4)** to return to the **Test Mode Menu**.

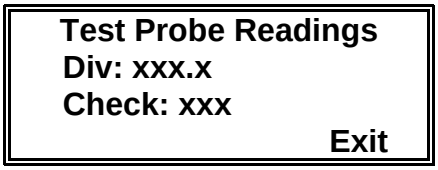
The reading is being performed. Do not press **Start (F1)** again or **Read (F3)** before the reading is complete or a **No Response From RDC - Check Connection** warning message will display. See below for details on navigating back to the **Test Mode Menu** after getting the warning message display.

> ***NOTE:*** ***It will take up to 4 minutes to successfully complete the reading. The Checkmate DL will power off after 2 minutes if left idle after reading. This is normal behavior of the equipment. The reading will still commence on the RDC.***

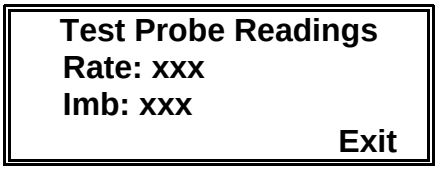
# Display the "Test Read" Results

When adequate time has passed, the test reading result may be viewed by pressing the following sequence of buttons. From the **Standby** display press **SetUp (F4)**, then select **RDC (F2)** from the **Configuration Options** display to proceed to the **RDC Configuration** display. Select **Test Mode (F3)** to advance to the **RDC Test Mode** screen. Press the **Read Test Probe (F1)** to proceed to the **Test Mode Menu**; press **Read (F3)** to advance to one of the following displays.

If the unit is a RDC – COT or a 4 Channel RDC – COT, the following display will appear:




If the unit is a RDC – CAT, the following display will appear:

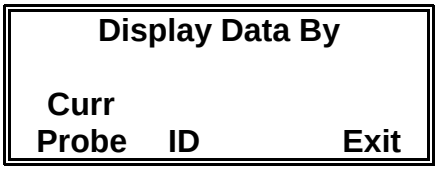


If the following warning appears, check connection integrity. Pressing **Exit (F4)** will return the Checkmate DL to the **Configuration Options** display, select **RDC (F2)** to advance to the next display. Press **Test Mode (F3)** to enter the **RDC Test Mode** display and press **Read Test Probe (F1)** to return to the **Test Mode Menu**.

# Chapter 8
# Displaying RDC Data on the Checkmate DL

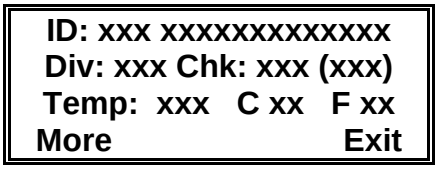
Probe reading data stored on RDCs can be transferred to the PC using Corrdata Plus or the latest reading may be displayed on the Checkmate DL for user convenience. For Corrosometer probes data includes the Tag ID, Metal Loss, Corrosion Rate, Divisions and Check Readings, Alloy, Span, Temperature (where applicable), number of Readings, and Interval. For Corrater probes data includes Tag ID, Corrosion Rate, Imbalance, Temperature, Alloy, Multiplier, number of Readings, and reading Interval.

From the **Standby** screen, press **Disp (F2)** to proceed to the **Display Data By** display:

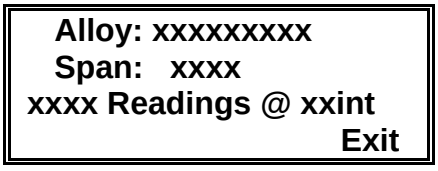



Press **Curr Probe (F1)** to see the last viewed probe ID or press **ID (F2)** to select the probe by ID.

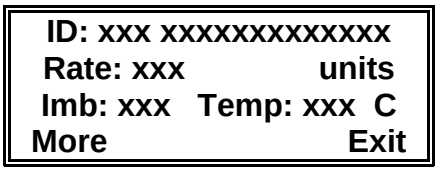
If a Corrosometer probe is attached to the RDC, following display will appear:




Press **More (F1)** to proceed to the next display:




If a Corrater probe is attached to the RDC, following display will appear:



Press **More (F1)** to proceed to the next display:

# Chapter 9
# Transferring RDC Data to the PC

Probe reading data is uploaded to the PC using the provided Corrdata Plus Corrosion Management Software program. This is a Windows compatible program that allows fast uploading of data stored in the Checkmate DL.

## Corrdata Plus Installation

The Corrdata Plus Corrosion Management Software program can be found on the CD-ROM included with the instrument. Insert the auto run CD-ROM and follow the on-screen instructions to install. The default installation directory is C:\Program Files\RCS\Corrdata Plus.

## Configuring Corrdata Plus

When the installation is complete, launch the Corrdata Plus program from **All Programs → Rohrback Cosasco Systems**. Follow the instructions on the Corrdata Plus User Manual provided on the CD-ROM for site setup and configuration.

## Connecting the Checkmate DL to the PC

Connect the Checkmate DL to the 9 pin serial port on the PC using the provided cable. Verify the correct COM port number is selected on the Corrdata Plus Corrosion Management Software program (in most cases this will be COM 1, however verify this in the device manager). If there is no serial port in the computer, use the included serial-to-USB converter cable to complete the connection.

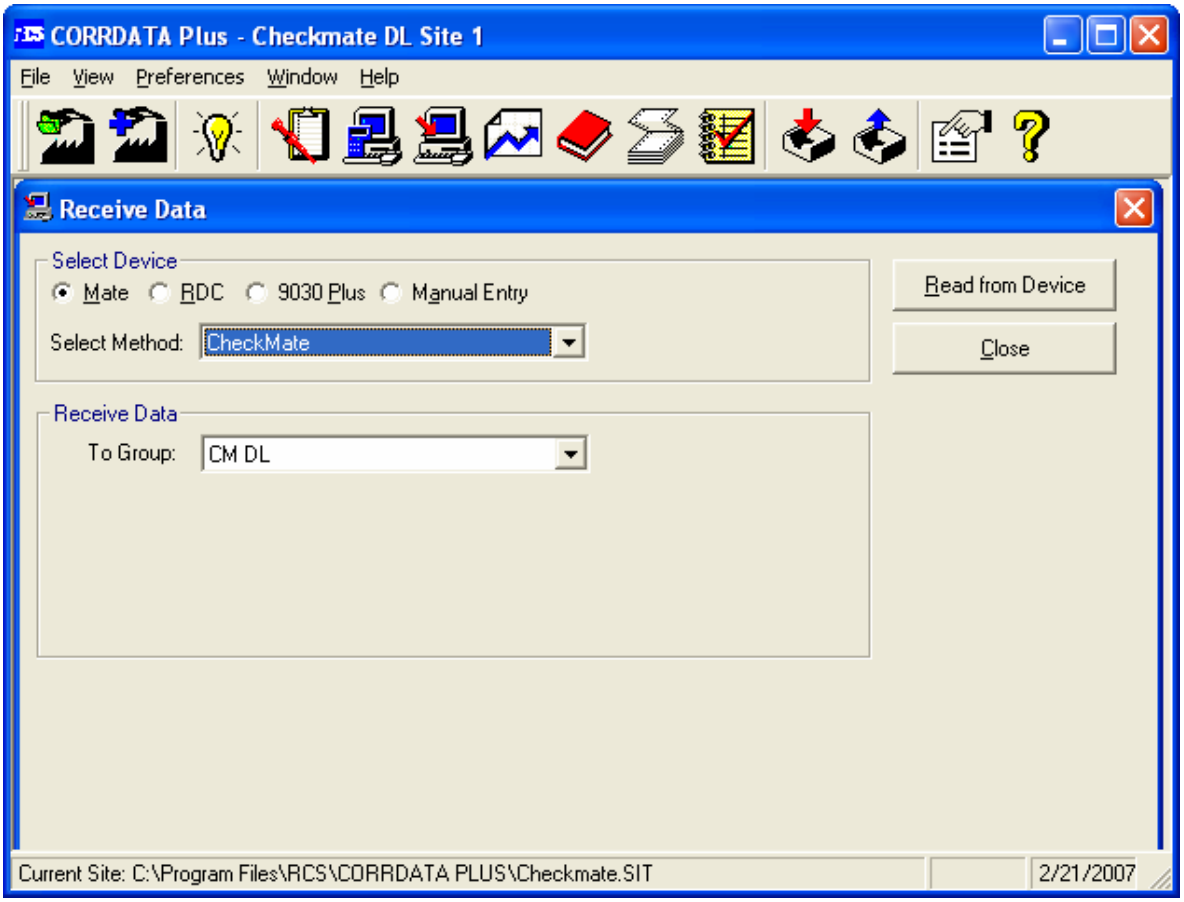
Launch and **Open an Existing Site** or **Create a New Site** on the Corrdata Plus Corrosion Management Software program. Ensure the correct port number is selected on **Preferences → Settings → Default Port:** section.

# Checkmate DL Data Transfer Procedure

From the **Standby** screen, press **Dump (F3)** to proceed to the following display:

| |
|---|
| **Connect Mate To PC** |
| **PC Must Be Running** |
| **Corrdata Software** |
| **Start** **Exit** |

On the Corrdata Plus Corrosion Management Software program, click the **Receive Data** command button, select **Mate** as the **Select Device**, and **Checkmate** as the **Select Method**. Choose the appropriate **To Group** selection. Click the **Read from Device** command button on the screen shown below:

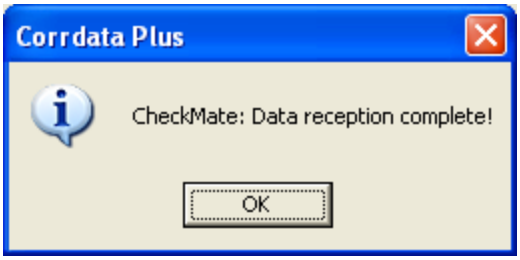



Press **Start (F1)** on the Checkmate DL to begin uploading data to the PC. Checkmate DL will show the following screen:

**Dumping Data to PC**
**Please Wait**

**ID: xxx xxxxxxxxxxx**

Once the data is successfully transferred, Checkmate DL will return to the **Standby** display screen and Corrdata Plus Corrosion Management Software will show the following dialogue box:




If the Checkmate DL is not connected to the PC properly, or the PC is not running the Corrdata Plus Corrosion Management Software program, one of the following screens may be displayed.

**WARNING!**
**Error Dumping Data**
**Check Connection**
**Exit**

**WARNING!**
**No Response From PC**
**Check Connection**
**Exit**

If either of the above screens appear, make sure that Corrdata Plus Corrosion Management Software is running, that the correct COM port is checked, and that the Checkmate DL is connected to that COM port using the supplied cable.

If data is still not transferred after checking the connection between the PC and Checkmate DL, please see the Troubleshooting section for further help.

# Chapter 10
# Initializing Checkmate DL for Microcor Systems

## Configuring Checkmate DL for Microcor Systems

If the Checkmate DL is programmed for the Corrdata System, it can be easily changed to the Microcor System as described below.

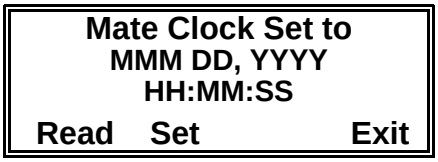
> ***WARNING!*** ***When switching Checkmate DL between Microcor and Corrdata Systems, all stored data will be erased! Be sure to transfer all stored data to the PC prior to changing the data collection system (see appropriate chapters for more details on data transfer).***

From the **Standby** display, press **Setup (F4**) then select **Mate Type (F3)** from the **Configuration Options** display. Press **Yes (F1)** to change the Checkmate DL FROM Corrdata technology to Microcor technology.

## Setting the Time and Date

The Checkmate DL has its own internal clock so that individual probe readings are automatically time and date stamped.

To set the Time and Date, from the **Standby** display, press **Mate (F4**) and then select **Set Clock (F2)** from the **Mate Functions** display to proceed to the **Mate Clock** display shown below:




Press **Set (F2)** to proceed to the **Set Mate Date & Time** display:

Using the keyboard, enter the last two digits of the year followed by the two digit number

of the month, date, the time in hours, minutes and seconds (enter 00 for seconds for convenience). When the time is set correctly, press **Enter (F1)** to start the clock. To update the clock on the **Mate Clock Set To** display, press **Read (F1)**. This will show the updated real time. Press **Exit (F4)** to proceed to the **Mate Functions** screen. Press **Exit (F4)** again to return to the **Standby** screen.

> ***NOTE:*** ***The time protocol is based on the military 24 hour clock, where 00:00 hours denote midnight at the start of the day, and 12:00 is noon.***

> ***NOTE:*** ***It is required to set the correct DAYLIGHT or STANDARD time zone into the Checkmate DL to accurately Date and Time stamp Data Logger readings. Refer to the AVAILABLE MEMORY SPACE AND STANDARD TIME ZONE section for more details.***

# Clearing the Checkmate DL Memory

Normally it will not be necessary to clear the memory on the Checkmate DL unless extraneous entries have been made, for example, when initially experimenting with the system. However, when the equipment is to be transferred to a new location, then it is recommended to clear the memory to avoid confusion with any previously collected data.

> ***NOTE:*** ***All data stored in internal memory of the Checkmate DL will be erased permanently when switching between Microcor and Corrdata Systems. Make sure to transfer stored data to the PC prior to changing the data collection system.***

To clear the memory, from the **Standby** display, press **Mate (F4**) then select **Clear Mate (F1)** from the **Mate Functions** display shown below:

| **Mate Functions** | | | |
|---|---|---|---|
| **Clear Mate** | **Set Clock** | **Mate Type** | **Exit** |

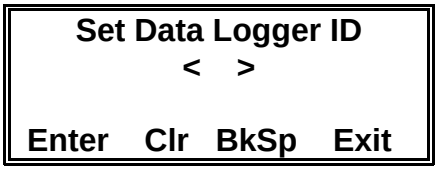
Press **OK (F1)** to proceed to clear the memory.

# Chapter 11
# Configuring and Programming Microcor Data Loggers

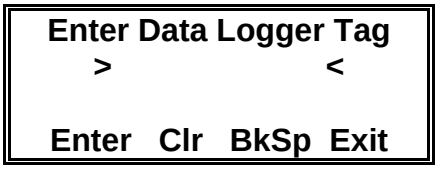
## Set Data Logger Configurations to Checkmate DL and Program Data Logger

This section explains the manual configuration of Microcor probes (attached to a Microcor Data Logger) onto the Checkmate DL. Once the Microcor Data Logger information is properly configured into the Checkmate DL, Data Loggers will need to be programmed.

Connect the Checkmate DL to the Microcor Data Logger; from the **Standby** display, press **Conf (F2**) to proceed to the **Set Data Logger ID** display:




Enter a the desired ID number from 0 to 99 and press **Enter (F1)** to proceed to the **Set Data Logger Tag** display. If the ID selected has already been configured, the user will be notified; if continued with the configuration, all previously accumulated data will be erased from the Data Logger.

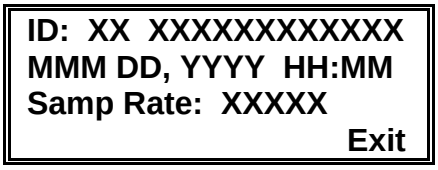



In the **Enter Data Logger Tag** display, enter up to twelve (12) alpha/numeric characters to uniquely identify the monitoring location. This can be a tag number, location or process name. Pressing **Clr (F2)** clears a previously entered ID. Pressing **BkSp (F3)** backs up one space for each time it is pressed so that a change can be made. Pressing **Exit (F4)** returns to the **Standby** display.

Press **Enter (F1)** to proceed to the **Set Sample Rate** display:

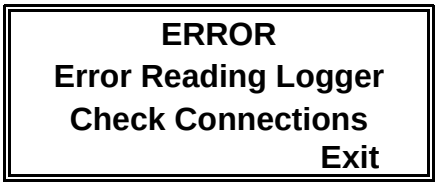
Set the desired sample rate and press **Enter (F1)** to complete the configuration.

Data Logger is successfully configured when the Checkmate DL displays the screen below. Date and Time settings are automatically programmed into the Data Logger using the programmed Checkmate DL time and date. Press **Exit (F4)** to return to the **Standby** screen from the following display:



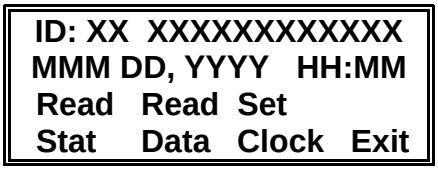

***NOTE:*** ***It is necessary to set the correct DAYLIGHT or STANDARD time zone into the Checkmate DL to accurately Date and Time stamp Data Logger readings. Refer to the AVAILABLE MEMORY SPACE AND STANDARD TIME ZONE section for more details.***

If following error messages appear on the Checkmate DL during the Data Logger configuration, verify the Checkmate DL is properly connected to the Data Logger.




# Set Data Logger Time

The Data Logger Date and Time is automatically set when the unit is configured using the Checkmate DL. However, it is possible to update or reset the time if required or if the display indicates "**CLOCK NOT SET!**" To set the Data Logger Time and Date, connect the Checkmate DL to the Data Logger with the provided adapter cable connector. From the **Standby** screen, press **Read (F1)** to proceed to the following display with the attached Data Logger information:



Press **Set Clock (F3)** to update the Data Logger with the set time of the Checkmate DL.

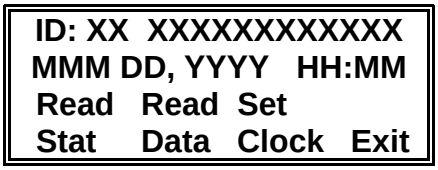
> ***NOTE:*** ***It is necessary to set the correct DAYLIGHT or STANDARD time zone into the Checkmate DL to accurately Date and Time stamp Data Logger readings. Refer to the AVAILABLE MEMORY SPACE AND STANDARD TIME ZONE section for more details.***

# Chapter 12
# Reading a Data Logger with the Checkmate DL

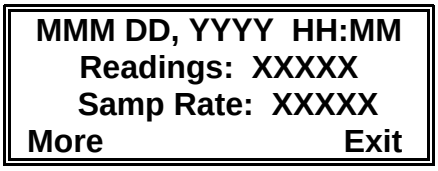
The Checkmate DL is designed to configure and gather data from all Microcor Data Loggers (ML 9500A and/or ML 9500B). Refer to **Set Data Logger Configurations to Checkmate DL and Program Data Logger** section for more details. The following section will explain the data collection procedure from Microcor Data Loggers.

## Read Data Logger Configuration and Status

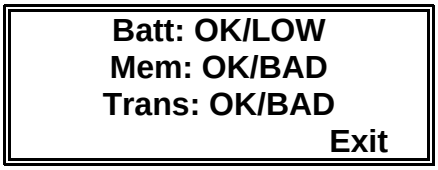
Configurations already set into the Data Logger are easily read with the Checkmate DL. Connect the Checkmate DL to the Data Logger with the provided adapter cable connector. From the **Standby** screen, press **Read (F1)** to proceed to the following display with the attached Data Logger information:




Press **Read Stat (F1)** to display the Data Logger time, number of readings and the sample rate as shown below:

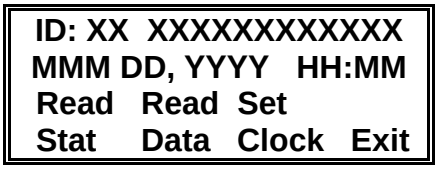



Press **More (F1)** to continue to the next display which shows the battery, memory and transmission information as shown below. Battery status will show **OK** or **LOW**. Memory and Transmission will show **OK** or **BAD** depending on their status.

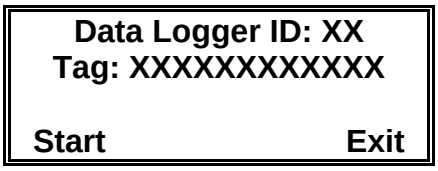


# Reading / Clearing Data from Microcor Data Loggers

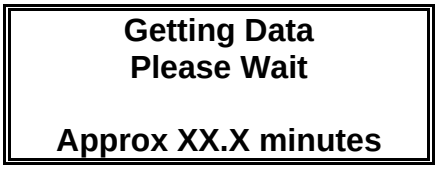
To read a Data Logger, connect the Checkmate DL to the Data Logger with the provided adapter cable connector. From the **Standby** screen, press **Read (F1)** to proceed to the following display with the attached Data Logger information:



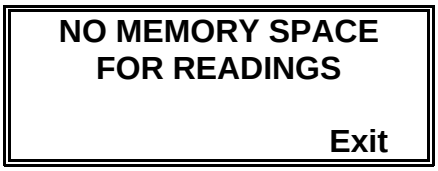

Press **Read Data (F2)**; Checkmate DL will perform a series of internal checks and proceed accordingly. First, Checkmate DL will check whether the ID is properly assigned. If the ID is not properly assigned, it will prompt the user to set the Data Logger ID and the Tag information. It will then determine if any readings for this ID are stored in the Checkmate DL. If any data for the ID exists in the Checkmate DL, then the user will be prompted to either **Overwrite (F1)** or **Abort (F4)**. Overwriting will delete the existing data for that ID and replace it with the new data being read. Once these internal checks are performed and any issues resolved, Checkmate DL will proceed to the following screen:




Press **Start (F1)** from the above screen to begin the read process. The Checkmate DL will show the following screen during data transfer.



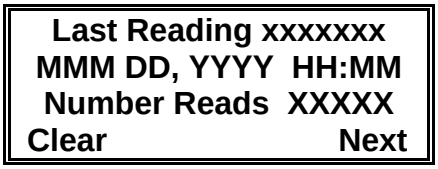

If "**NO MEMORY SPACE FOR READINGS**" screen appears (shown below), then the Checkmate DL memory will need to be cleared before transferring the data. It is recommended that ALL existing data on the Checkmate DL be transferred to a PC prior to erasing ANY data. Refer to the section **Clearing the Checkmate DL Memory** on the **Initializing Checkmate DL to Work with Microcor Systems** chapter.



Once the data is successfully read and transferred it is displayed as shown below. Users can at this time elect to delete the Data Logger content if desired.

***NOTE:*** ***All data stored for this ID on the Checkmate DL will be erased if "Clear" button is pressed.***

Press **Clear (F1)** to clear Data Logger readings or **Next (F4)** to return back to the Data Logger information screen.



# Chapter 13
# Transferring Data Logger Data to the PC

Data Logger data is downloaded to the PC using the provided Microcor® Tools Software program. This is a Windows compatible program that allows fast download of data stored in the Checkmate DL.

## Microcor Tools Installation

The Microcor Tools Software program can be found on the CD-ROM included with the instrument. Insert the auto run CD-ROM and follow the on screen instructions to install. The default installation directory is C:\Program Files\Microcor Tools\MCorSetup.

## Configuring Microcor Tools

When the installation is complete, launch the Microcor Tools Software program from **All Programs → RCS.** Follow the instructions on the Microcor Tools User Manual (provided on the CD-ROM) for site setup and configuration.

## Connecting the Checkmate DL to the PC

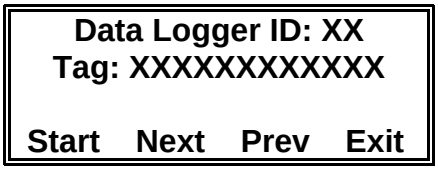
Connect the Checkmate DL instrument to the 9 pin serial port on the PC using the provided cable. If there is no serial port in the computer, use the included serial-to-USB converter cable to complete the connection. Make sure to set the correct COM port number on the Microcor Tools Software program Data Logger Communication area (in most cases this will be COM 1, however verify this in the device manager).

Launch and open a site from **Existing Sites** or create a **New Site** on the Microcor Tools Software program. Verify the correct port number is selected on the **Data Logger Communication** area.

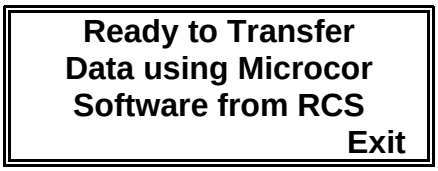
# Checkmate DL Data Transfer Procedure

From the **Standby** screen, press **Data (F3)** to advance to the following display:

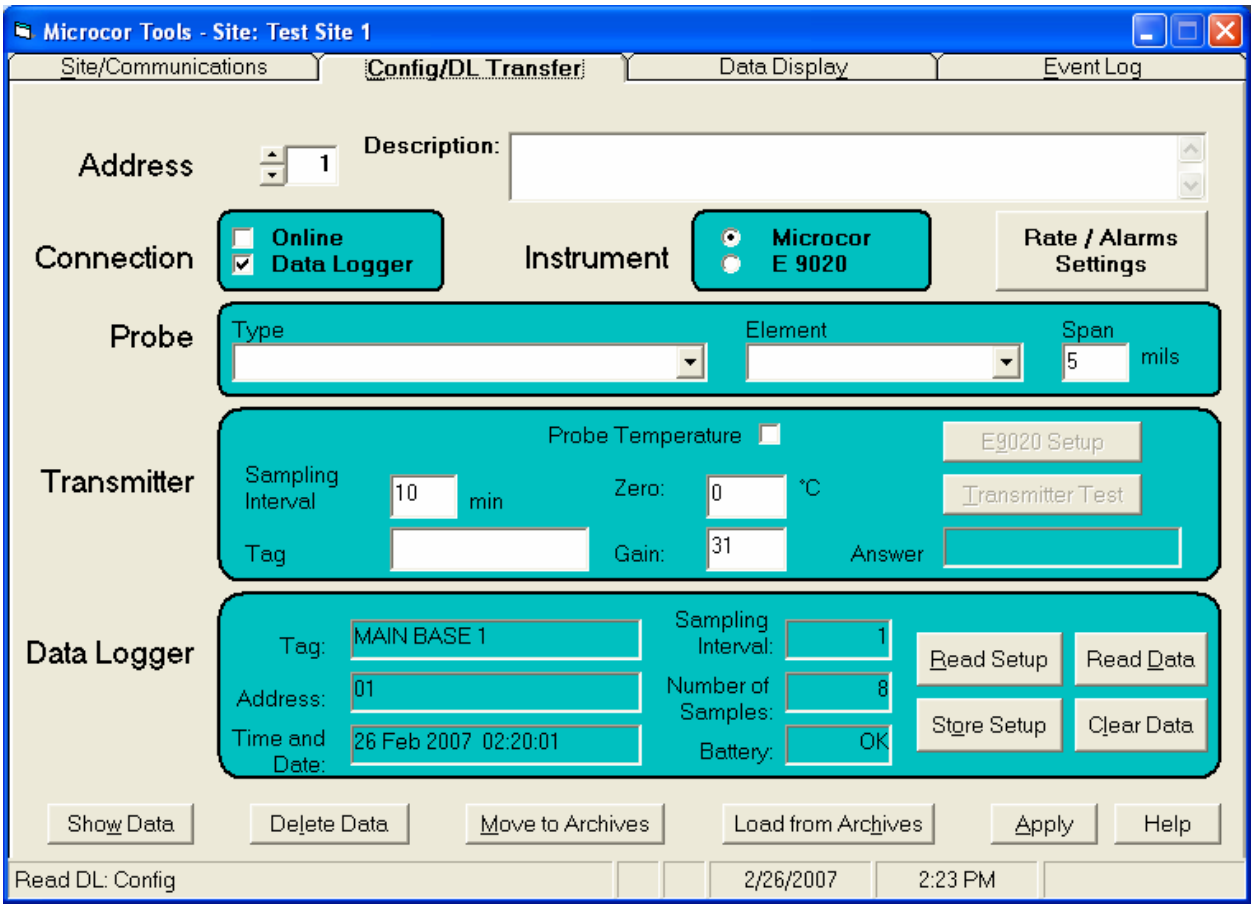
Press the **Start (F1)** to proceed to the next screen. Use **Next (F2)** and **Prev (F3)** to navigate the ID list (0 – 99) and select the desired ID to transfer data (shown below).




Once the ID is selected, press **Start (F1)**. Following screen will appear:




Data is now ready for transfer from the Checkmate DL to the PC. On the Microcor Tools Software program, select the **Site** and navigate to the **Config/DL Transfer** screen, select **Data Logger** as the **Connection** type and **Microcor** as the **Instrument** (see image below). Click the **Read Data** command button to begin the transmission. It is also possible to click the **Read Setup** command button to transfer the configuration data of the Data Logger to the **Data Logger** section on the **Config/DL Transfer** screen.




During the data transfer, the following screen will be displayed on the Checkmate DL:

**Data Transfer in Progress!**
**xxxxx Readings Left**
**Exit**

The number of readings (xxxxx) counts down as the data is transferred to Microcor Tools. Upon successful transmission, Checkmate DL will show the following screen:

**Data Transfer Done!**
**Exit**

Press **Exit (F4)** to return to the Data Transfer screen to choose another ID for data transfer.

***NOTE:*** ***Only one Data Logger information can be transferred at a time, when transferring information of more than one Data Logger, change the Address on the***

***Microcor Tools Software program for each transfer so that all data is not transferred only to one ID address.***

In case of any error messages displayed on Checkmate DL, check connections between Checkmate DL and the PC, make sure that Microcor Tools Software program is running and that the correct COM port is checked.

If data is still not transferred after checking the connection between the PC and Checkmate DL, please see the Troubleshooting section for further help.

# Chapter 14
# Troubleshooting Guide

| Symptom | Problem | Solution |
|---|---|---|
| Checkmate DL will not turn on | -Batteries not installed<br>-Battery voltage low<br>-Batteries installed incorrectly | -Install batteries<br>-Install new batteries<br>-Check the polarities as indicated on the unit |
| Checkmate DL turns off before 2 minutes auto shutdown | -Battery voltage low | -Install new batteries |
| Checkmate DL will not transfer data to the computer | -Corrdata Plus Corrosion Management Software is not running when using Corrdata System Configuration | -Launch Corrdata Plus Corrosion Management Software from the Start Menu |
| | -Cable is not connected properly. | -Check that the cable is fully plugged into Checkmate DL and that the other end is fully plugged into the 9 pin serial port on the back of the PC |
| | -Check the COM ports | -Check that the COM port selected in Corrdata Plus Corrosion Management Software or Microcor Tools is the actual COM port to which the Checkmate DL is connected |
| | -Microcor Corrosion Management Software is not running when using Microcor System Configuration | -Launch Microcor Tools Software from the Start Menu<br>-Refer to the User Manual sections on Transferring Data from Checkmate DL to the PC for more details |
| RDC will not transfer data to the Checkmate DL | -Cable is not connected properly | -Check Connections to the RDC |
| | -Battery voltage low on RDC | -Install new batteries |
| Microcor Data Logger will not transfer data to the Checkmate DL. | -Cable is not connected properly | -Check Connections to the RDC |
| | -Battery voltage low on Data Logger | -Install new battery |
| Inaccurate Time and Date Stamp on Data Logger Readings | - Time Zone not set properly | -Set the Standard Time Zone, refer to the User Manual for more details |

# Appendix A
# Interconnect Diagram Drawing

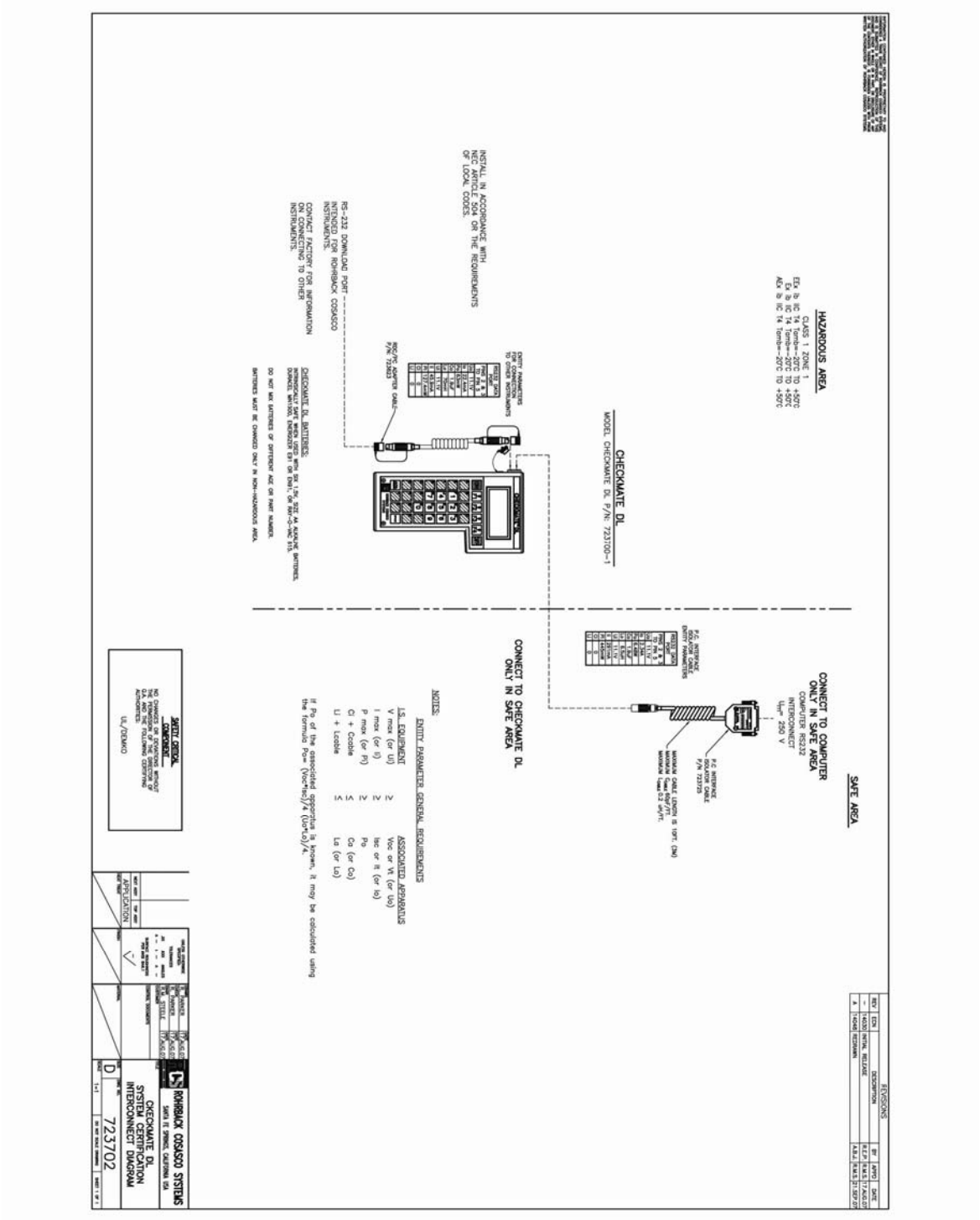

HAZARDOUS AREA
CLASS 1 ZONE 1
Ex ib IIC T4 Tamb=-20°C TO +50°C
Ex ib IIC T4 Tamb=-20°C TO +50°C
AEx ib IIC T4 Tamb=-20°C TO +50°C
CHECKMATE DL
MODEL CHECKMATE DL P/N: 723700-1
INSTALL IN ACCORDANCE WITH NATIONAL CODES OR THE REQUIREMENTS OF LOCAL CODES.
RS-232 DOWNLOAD PORT INTENDED FOR ROHRBACK COSASCO INSTRUMENTS.
CONTACT FACTORY FOR INFORMATION ON CONNECTING TO OTHER INSTRUMENTS.
CHECKMATE DL BATTERIES:
DO NOT MIX BATTERIES OF DIFFERENT AGE OR PART NUMBER.
BATTERIES MUST BE CHANGED ONLY IN NON-HAZARDOUS AREA.
SAFE AREA
CONNECT TO COMPUTER ONLY IN SAFE AREA
COMPUTER RS232
INTRINSICALLY SAFE
Um= 250 V
CONNECT TO CHECKMATE DL ONLY IN SAFE AREA
NOTES:
ENTITY PARAMETER GENERAL REQUIREMENTS
ASSOCIATED APPARATUS
Voc or Vt (or Uo)
Isc or It (or Io)
Po
Ca (or Co)
La (or Lo)
If Po of the associated apparatus is known, it may be calculated using the formula Po= (Voc*Isc)/4 (Uo*Io)/4.
ROHRBACK COSASCO SYSTEMS
SANTA FE SPRINGS, CALIFORNIA USA
CHECKMATE DL
SYSTEM CERTIFICATION
INTERCONNECT DIAGRAM
723702
D

**Figure A.1 Interconnect Diagram Drawing**